

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:) Group Art Unit: 2871
)
JUIZHI XUE, et al.) Examiner: Thoi V. Duong
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Serial No.: 09/591,437)
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Filed: June 9, 2000)
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Atty. File No.: 50041-00037)
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For: "CHEVRON-FREE FLC DEVICE")
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REPLY BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
MAIL STOP: APPEAL BRIEF - PATENTS

Dear Sir:

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The structure of Appellant's Reply Brief is as follows:

- I. Status of Claims
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I. STATUS OF CLAIMS

The status of the claims is as follows:

1. Claims pending: 1 - 26;
2. Claims rejected: 1 - 10, 12, and 14 - 26;
3. Claims objected to: 11
4. Claims allowed: 13; and
5. Claims appealed: 1 - 12 and 14 - 26.

II. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1, 3-10, 14, 16-24, and 26 have been rejected as anticipated by Liu (USPN 6,141,076).
2. Claims 2, 12, and 15 have been rejected under 103(a) as being unpatentable over Liu (USPN 6,141,076) in view of Iwayama (USPN 5,323,253).
3. Claim 25 has been rejected under 35 USC 112, second paragraph, as not enabled.

III. ARGUMENTS

Claim Group A

The rejection of claims 1, 3-10, 14, and 16-24 has now been changed in the Examiner's Answer from obvious over Liu to anticipated by Liu. Claims 2, 12, and 15 have been rejected as obvious over the combination of Liu and Iwayama. Claim 11 is objected to as dependent on a rejected claim. Applicants wish to express their extreme frustration with the Examiner in what appears to be a game of moving the target.

This case was originally appealed via a Notice of Appeal filed on September 25, 2003 and an Appeal Brief filed on December 1, 2003 that appealed the rejections in a Final Office Action mailed March 25, 2003. In that Office Action, the claims had been rejected as anticipated by Liu. After we spent the time and money to prepare and file an Appeal Brief, the Examiner re-opened prosecution to change the grounds of rejection to the claims being obvious in light of Liu. The Examiner maintained this position in a Final Office Action mailed June 3, 2005. Once we again spent the time and money to prepare and file an Appeal Brief, the Examiner changes the ground of rejection back to one of anticipation (bringing the grounds of rejection back to the identical grounds as in the Final Office Action in 2003). The claims have not been amended at all during this time period, so the Applicants have not caused these shifting grounds of rejection. The Applicants hereby request that this nonsense stop now and that this appeal be maintained.

Each of the rejected claims is believed to be patentable over Liu (whether or not combined with Iwayama) at least because Liu does not disclose or suggest a cross-buffed device wherein the ferroelectric liquid crystal material is free of chevron structures. Further Liu does not discuss the ferroelectric liquid crystal material being free of chevron structures without the need to otherwise apply an additional treatment to the optical device.

Generally, conventional ferroelectric liquid crystal (FLC) devices have undesirable chevron structures that are formed in the FLC material (see discussion in applicants' patent application at page 2, lines 18-33). Various attempts have been made to prevent the formation of chevron structures, such as applying an additional treatment in the form of an electrical signal to the FLC material after it is inserted into the device (see applicants' patent application at page 2, line 34 through page 3, line 3). When the chevrons are straightened out by such an additional treatment, they are said to have a structure called "quasi-bookshelf" (see relevant passages (in Appendix B of the Appeal Brief) on pp 227-229 in Ferroelectric and Antiferroelectric Liquid Crystals, by Sven T. Lagerwall (1999) (the same passages were provided in the Response to Final Action filed May 27, 2003)).

Liu discusses chevrons and quasi-bookshelf structures in only two places in his patent (once in column 1 at lines 31-35, and again in column 4 at lines 35-37). In both places in Liu, the discussion is specifically limited to FLC cells that have either parallel or anti-parallel buffing; "cross-buffed" cells are excluded. Thus, Liu appears to be just reciting the prior-art problems with parallel-buffed devices that are also recited in applicants' patent application. Liu's teaching about his own invention, i.e. about cross-buffed FLC devices, is completely silent on the issue of chevrons. Applicants' invention is directed towards, and in its claims are limited to, FLC devices that are cross buffed (e.g., the non-zero angle Ω between the alignment directions).

It is respectfully submitted that the Examiner misrepresents what is disclosed by Liu. Liu discloses that, in a ferroelectric liquid crystal spatial light modulator, strong buffing in a 90°-twisted configuration produces a device with "relatively high scattering" (col. 4, lines 19-20). Liu again discloses (col. 4, lines 41-45) that strong buffing results in a modulator with a "multi-domain texture" having a "high transmission loss." Liu goes on to disclose, without further reference to scattering or transmission loss, that either strong or weak buffing, resulting in either strong or weak

anchoring, respectively, can produce devices with “excellent contrast” or “even greater contrast” (respectively) (col. 4, lines 46-55). Liu never states or even implies that a structure created in this manner is free from chevrons. It is certainly not *inherent* that Liu’s structure would be free of chevrons. “High contrast” is an undefined, relative term. All “high contrast” should be taken to mean is “contrast relatively higher than some other level of contrast.” Certainly it is possible to create a structure with relatively higher contrast than another structure without making the structure free from chevrons. The present applicant sells commercial FLC displays that are free from “scattering” and “multi-domain texture,” all exhibiting “excellent contrast,” all having an entirely chevron liquid crystal structure.

On the other hand, independent claims 1 and 14 claim an optical device (or, in the case of claim 14, a method for preventing formation of chevron structures in the optical device) that is free of chevron structures. Since this limitation is not found, suggested, or inherent in Liu, these claims are patentable, as are each of the claims that depend thereon. Since independent claims 1 and 14 are patentable over Liu, the dependent claims (Claims 2-12 and 15-24) are patentable as well.

Claim Group B

Claim 25 is patentable not only because of the limitations discussed above in conjunction with Claim Group A, but also at least because of the surface stabilized limitation in Claim 25. The Examiner has rejected Claim 25, stating that it contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Apparently it is the limitation “wherein the ferroelectric liquid crystal material in the optical device is surface stabilized” that the Examiner feels a skilled practitioner would have difficulty with.

In fact, the term “surface stabilized” is widely used in the ferroelectric liquid crystal art. It has been used at least since 1984, as evidenced by the attached page (in Appendix C of the Appeal Brief) from a paper by Noel A. Clark and Sven T. Lagerwall entitled “Surface-Stabilized Ferroelectric Liquid Crystal Electro-optics: New Multistate Structures and Devices,” published in *Ferroelectrics* vol. 59, pp. 25-67 (1984). It is also found in handbooks on the subject, as evidenced by the attached page (in Appendix D of the Appeal Brief) from a chapter entitled “Electric Field Effects in Liquid Crystals,” by L.M. Blinov in the *Handbook of Liquid Crystal Research* edited by Peter J. Collings and Jay S. Patel (Oxford University Press, Oxford, 1997).

From both these examples, it is clear that this term “surface stabilized” means exactly the same thing in the art as it does in applicant’s specification -- an FLC device that is sufficiently thin enough to prevent helical rotation of the director of each FLC molecule through the smectic layers (patent application at Figure 1B; page 1, lines 7-25; page 5, lines 15-16; and page 7, lines 17-29).

The same terminology is widely used in U.S. patents. When searching the US patent data base, applicant finds 251 instances of patents that contain “surface stabilized” in conjunction with FLC.

We submit that the invention we claim in claim 25 is fully enabled by the drawings and language in the patent application at Figure 1B; page 1, lines 7-25; page 5, lines 15-16; and page 7, lines 17-29.

The Examiner argues in the Advisory Action mailed August 24, 2005 that he “maintains the rejection of claim 25 since the SSFLC comprising a structure free of chevron without a need to otherwise apply an additional treatment to the optical device is not conventional.” Of course it is not conventional, as it is a key part of the patentable invention.

Furthermore, as evidenced by the passage in the patent application at page 1, lines 22-25, a surface stabilized ferroelectric liquid crystal can be created by suppressing the formation of helical

structures in the FLC by reducing the spacing between the substrates (and thus the thickness of the FLC layer) down to a few microns. In addition, in the passages at page 7, lines 17-29, it is clear that 1 micron spherical spacers are used to maintain the substrates 332A and 332B in Figure 4 at a spacing of 1 micron before the Chisso Chemical commercial FLC mixture designated CS1025 is inserted between the substrates. As is shown in the attached (Appendix E) data sheet from Chisso Petrochemical Corp., dated March 27, 1989, the helical pitch of CS1025 is 10 microns in the smecticC* phase. With a layer of FLC material much smaller than the helical pitch, the formation of helical structures will be eliminated and the device will be surface stabilized.

Now in the Examiner's Answer, he repeats a statement, also made earlier in prosecution (Final Office Action mailed March 25, 2003 and Advisory Action mailed June 17, 2003), that cannot be understood. Further the relevance of the statement to the issue of enablement cannot be understood. Here it is:

According to USPN 6,141,076, Liu discloses a similar structure free of chevron with the claimed invention as discussed above and alignment treatment is only treatment; however, Liu's disclosure directs to a non-surface-stabilized ferroelectric liquid crystal instead of a surface-stabilized FLC of the claimed invention. Because Liu's disclosure has been patented, Liu's disclosure is presumed valid over the claimed invention. (emphasis added)

We are completely unable to make any sense of the last sentence. As can be appreciated, the invention of claim 25 is fully enabled by the specification, and this claim should be allowed.

Claim Group C

Claim 26 is patentable not only because of the limitations discussed above in conjunction with Claim Group A, but also at least because of the “sufficiently small spacing to suppress formation of helixes” limitation in Claim 26. This limitation is not found in Liu in an embodiment that shows cross buffing. It is only discussed with reference to conventional devices of the prior art. The Examiner points to column 3, lines 50-60 of Liu, where there is a general discussion of FLCs and suppression of helixes with thin cell thickness. There is no discussion of cross buffing relating to this discussion.

The combination of the key limitations in Claim 26 ((a) the substrates have alignment treatments with alignment directions that form a non-zero angle with each other (“cross buffing”), (b) the optical device is free of chevron structures without a need to otherwise apply an additional treatment to the optical device, and (c) the first and second substrates are spaced apart by a distance sufficiently small to suppress formation of helixes typically formed in bulk of the ferroelectric liquid crystal material) is not disclosed or suggested in Liu and thus is patentable over Liu. For this reason, in addition to the reasons discussed in conjunction with Claim Group A, the claim of Group C is patentable.

IV. CONCLUSION

Based upon the foregoing, Appellant respectfully requests the Board to reverse the Examiner's rejections of the non-allowed claims and to pass the above-identified patent application to issuance.

Respectfully submitted,

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